AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. In the listing, Claims 13, 15-18, and 31-33 have been amended.

1.   **(Original)**   A hard disk drive comprising:

a rotatable disk having a magnetic recording media wherein the rotatable disk defines a plurality of concentric servo tracks;

a pivotable actuator that is movable with respect to the rotatable disk;

a transducer disposed on the actuator so as to be positioned with respect to selected ones of the plurality of concentric servo tracks;

a controller that controls the movement and position of the transducer with respect to the selected servo tracks;

a shock detection system that analyzes a signal indicative of a movement of at least a portion of the hard disk drive and determines whether the hard disk drive has experienced a shock event; and

a shock event logger that records information about the shock event as determined by the shock detection system.

2.   **(Original)**   The hard disk drive of Claim 1, wherein the shock event logger records the shock event information to a memory.

3.   **(Original)**   The hard disk drive of Claim 2, wherein the memory is a non-volatile memory.

4.   **(Original)**   The hard disk drive of Claim 3, wherein the non-volatile memory is a semiconductor memory.

5.   **(Original)**   The hard disk drive of Claim 3, wherein the non-volatile memory is a portion of the rotatable disk.

6.   **(Original)**   The hard disk drive of Claim 1, wherein the shock detection system comprises a shock sensor signal processor that analyzes a signal from a shock sensor.

7.   **(Original)**   The hard disk drive of Claim 6, wherein the shock sensor is an accelerometer that measures linear acceleration.

8.   **(Original)**   The hard disk drive of Claim 6, wherein the shock sensor is an accelerometer that measures rotational acceleration.

9.   **(Original)**   The hard disk drive of Claim 6, wherein the shock sensor comprises accelerometers that measure both linear and rotational accelerations.

10.   **(Original)**   The hard disk drive of Claim 1, wherein the shock detection system comprises a back-emf signal processor that analyzes a back-emf signal generated when the actuator moves.

11.   **(Original)**   The hard disk drive of Claim 1, wherein the shock detection system comprises a position error signal processor that analyzes the position error signal indicative of a position deviation of the transducer from a reference position.

12.   **(Original)**   The hard disk drive of Claim 11, wherein the position error signal processor determines that a shock event has occurred when the position error signal exceeds a predetermined threshold value.

13.   **(Currently Amended)**   ~~The hard disk drive of Claim 12, wherein the predetermined threshold value is a position error signal representing~~ **A hard disk drive comprising:**

          a rotatable disk having a magnetic recording media wherein the rotatable disk defines a plurality of concentric servo tracks;

          a pivotable actuator that is movable with respect to the rotatable disk;

          a transducer disposed on the actuator so as to be positioned with respect to selected ones of the plurality of concentric servo tracks;

a controller that controls the movement and position of the transducer with respect to the selected servo tracks;

a shock detection system that analyzes a signal indicative of a movement of at least a portion of the hard disk drive and determines whether the hard disk drive has experienced a shock event;

a shock event logger that records information about the shock event as determined by the shock detection system; and

wherein the shock detection system comprises a position error signal processor that analyzes the position error signal indicative of a position deviation of the transducer from a reference position and determines that a shock event has occurred when the position error signal exceeds a predetermined threshold value of approximately 32% of a track width.

14. (Original) The hard disk drive of Claim 12, wherein the shock event logger records the position error signal to the non-volatile memory.

15. (Currently Amended) The hard disk drive of Claim 14, A hard disk drive comprising:

a rotatable disk having a magnetic recording media wherein the rotatable disk defines a plurality of concentric servo tracks;

a pivotable actuator that is movable with respect to the rotatable disk;

a transducer disposed on the actuator so as to be positioned with respect to selected ones of the plurality of concentric servo tracks;

a controller that controls the movement and position of the transducer with respect to the selected servo tracks;

a shock detection system that analyzes a signal indicative of a movement of at least a portion of the hard disk drive and determines whether the hard disk drive has experienced a shock event;

a shock event logger that records information about the shock event as determined by the shock detection system; and

wherein the shock detection system comprises a position error signal processor that analyzes the position error signal indicative of a position deviation of the transducer from a reference position and determines that a shock event has occurred when the position error signal exceeds a predetermined threshold value; and

wherein the shock event logger records position error signals corresponding to a plurality of shock events in a sequential manner to the non-volatile memory.

16.   (Currently Amended)   ~~The hard disk drive of Claim 14,~~ A hard disk drive comprising:

a rotatable disk having a magnetic recording media wherein the rotatable disk defines a plurality of concentric servo tracks;

a pivotable actuator that is movable with respect to the rotatable disk;

a transducer disposed on the actuator so as to be positioned with respect to selected ones of the plurality of concentric servo tracks;

a controller that controls the movement and position of the transducer with respect to the selected servo tracks;

a shock detection system that analyzes a signal indicative of a movement of at least a portion of the hard disk drive and determines whether the hard disk drive has experienced a shock event; and

a shock event logger that records information about the shock event as determined by the shock detection system.

wherein the shock detection system comprises a position error signal processor that analyzes the position error signal indicative of a position deviation of the transducer from a reference position and determines that a

shock event has occurred when the position error signal exceeds a predetermined threshold value;

wherein the shock event logger records the position error signal to the non-volatile memory; and

wherein the shock event logger records the number of shock events in an incremental register.

17.   (Currently Amended)   ~~The hard disk drive of Claim 14,~~ A hard disk drive comprising:

a rotatable disk having a magnetic recording media wherein the rotatable disk defines a plurality of concentric servo tracks;

a pivotable actuator that is movable with respect to the rotatable disk;

a transducer disposed on the actuator so as to be positioned with respect to selected ones of the plurality of concentric servo tracks;

a controller that controls the movement and position of the transducer with respect to the selected servo tracks;

a shock detection system that analyzes a signal indicative of a movement of at least a portion of the hard disk drive and determines whether the hard disk drive has experienced a shock event;

a shock event logger that records information about the shock event as determined by the shock detection system;

wherein the shock detection system comprises a position error signal processor that analyzes the position error signal indicative of a position deviation of the transducer from a reference position and determines that a shock event has occurred when the position error signal exceeds a predetermined threshold value;

wherein the shock event logger records the position error signal to the non-volatile memory; and

wherein the shock event logger records a histogram of the position error signal, wherein the histogram represents a plurality of shock events.

18.   (Currently Amended)   ~~The hard disk drive of Claim 1,~~ A hard disk drive comprising:

a rotatable disk having a magnetic recording media wherein the rotatable disk defines a plurality of concentric servo tracks;

a pivotable actuator that is movable with respect to the rotatable disk;

a transducer disposed on the actuator so as to be positioned with respect to selected ones of the plurality of concentric servo tracks;

a controller that controls the movement and position of the transducer with respect to the selected servo tracks;

a shock detection system that analyzes a signal indicative of a movement of at least a portion of the hard disk drive and determines whether the hard disk drive has experienced a shock event;

a shock event logger that records information about the shock event as determined by the shock detection system; and

wherein the shock detection system comprises a position error signal processor that monitors an elapsed time taken for the position deviated transducer to return to and maintain a position within a reference window for a predetermined time, wherein the position error signal processor determines that a shock event occurred when the elapsed time exceeds a predetermined duration.

19.   (Original)   The hard disk drive of Claim 18, wherein the predetermined duration is the time taken for a predetermined number of wedge-to-wedge time intervals encountered by the transducer, wherein the wedge-to-wedge time interval represents a unit of time that depends on the rotational speed of the disk and the number of servo wedges per servo track.

20.   **(Original)**   The hard disk drive of Claim 19, wherein the predetermined duration is 100 wedge-to-wedge time intervals.

21.   **(Original)**   The hard disk drive of Claim 19, wherein the predetermined duration is 300 wedge-to-wedge time intervals.

22.   **(Original)**   The hard disk drive of Claim 19, wherein the predetermined duration is 500 wedge-to-wedge time intervals.

23.   **(Original)**   The hard disk drive of Claim 18, wherein the shock event logger records the elapsed time to the non-volatile memory.

24.   **(Original)**   The hard disk drive of Claim 23, wherein the shock event logger records elapsed times corresponding to a plurality of shock events in a sequential manner.

25.   **(Original)**   The hard disk drive of Claim 23, wherein the shock event logger records the number of shock events in an incremental register.

26.   **(Original)**   The hard disk drive of Claim 23, wherein the shock event logger records a histogram of the elapsed time, wherein the histogram represents a plurality of shock events.

27.   **(Original)**   A method of logging shock events in a hard disk drive comprising a rotatable disk having a magnetic recording media, the method comprising:

monitoring a signal from a component of the hard disk drive that responds to at least one of displacement, velocity, or acceleration of at least a portion of the hard disk drive;

evaluating the signal to determine whether the at least one of displacement, velocity, or acceleration is a result of a shock event; and

recording information about the shock event.

28.   **(Original)**   The method of Claim 27, wherein recording comprises logging of information about the shock event to a non-volatile memory.

29.   **(Original)**   The method of Claim 28, wherein logging to the non-volatile memory comprises logging to a semiconductor memory.

30.   **(Original)**   The method of Claim 28, wherein logging to the non-volatile memory comprises logging to a portion the rotatable disk.

31.   **(Currently Amended)**   ~~The method of Claim 28,~~ <u>A method of logging shock events in a hard disk drive comprising a rotatable disk having a magnetic recording media, the method comprising:</u>

<u>monitoring a signal from a component of the hard disk drive that responds to at least one of displacement, velocity, or acceleration of at least a portion of the hard disk drive;</u>

<u>evaluating the signal to determine whether the at least one of displacement, velocity, or acceleration is a result of a shock event;</u>

<u>recording information about the shock event;</u>

<u>wherein recording comprises logging of information about the shock event to a non-volatile memory; and</u>

wherein logging of the shock event information is done in a sequential manner.

32.   **(Currently Amended)**   ~~The method of Claim 28,~~ <u>A method of logging shock events in a hard disk drive comprising a rotatable disk having a magnetic recording media, the method comprising:</u>

<u>monitoring a signal from a component of the hard disk drive that responds to at least one of displacement, velocity, or acceleration of at least a portion of the hard disk drive;</u>

<u>evaluating the signal to determine whether the at least one of displacement, velocity, or acceleration is a result of a shock event; and</u>

recording information about the shock event;

wherein recording comprises logging of information about the shock event to a non-volatile memory; and

wherein logging of the shock event information comprises incrementing a register to keep track of the number of shock events detected.

33.   (Currently Amended)   ~~The method of Claim 28,~~ **A method of logging shock events in a hard disk drive comprising a rotatable disk having a magnetic recording media, the method comprising:**

monitoring a signal from a component of the hard disk drive that responds to at least one of displacement, velocity, or acceleration of at least a portion of the hard disk drive;

evaluating the signal to determine whether the at least one of displacement, velocity, or acceleration is a result of a shock event; and

recording information about the shock event;

wherein recording comprises logging of information about the shock event to a non-volatile memory; and

wherein logging of the shock event information comprises recording a histogram of the shock event information, wherein the histogram represents a plurality of shock events.